Remarks and Arguments

Claims 1-26 have been presented for examination. Claims 1, 9, 17 and 23 have been amended. Claims 5 and 13 have been canceled.

Claims 1, 3, 6-9, 11, 14-17 and 19-26 have been rejected under 35 U.S.C. §103(a) as obvious over an article entitled "Enterprise JavaBeans Technology Server Component Model for the Java Platform", Anne Thomas, pages 1-24 (Thomas, previously cited) in view of U.S. Patent No. 6,442,541 (Clark, previously cited.) The examiner asserts that Thomas teaches basic Java Beans operation including the manner of interacting with Java Beans and the lookup service. However, the examiner admits that Thomas does not disclose controlling data passing between the driver software and the storage device to implement a data service. However, the examiner claims that the Clark patent discloses a database access mechanism in which management facade software receives data from the driver software and controls how that data passes between driver software and a storage device.

The present invention provides data services in a data storage system that is not designed to provide those data services. In particular, the data storage system with which the present invention operates is a simple system in which the data storage driver is designed to store and retrieve data from a storage device that the driver controls and is not designed to provide other data services. In order to provide such a service, the driver cannot be reconfigured or replaced because other programs expect the driver to function in a manner for which they have been designed. Consequently, the management facade software has a layer that resides in the host computer between the data storage driver and the storage device and selectively redirects data passing between these two elements to a kernel module that actually provides the service. The kernel module can provide data backup services by replicating the data, first by storing the data on the storage device and then by replicating that data on another storage volume. The system is thus transparent to the existing applications.

As mentioned in the response to the last office communication, the Thomas article is a general discussion of the Java Bean framework and the overall operation and architecture of a Java Bean system. As the examiner notes Thomas teaches providing access to existing infrastructure services. However, the Thomas article does

not discuss or suggest how to implement any specific system and, more particularly, does not teach or suggest how a data service system would be implemented with a general Java Beans architecture in a system that did not support such a data service.

The examiner suggests combining the teachings of the Thomas article with those of the Clark patent. The Clark patent discloses a system that uses Java Beans to control an existing database driver to retrieve information from a database. Once the data has been retrieved, the Clark patent discloses reformatting that data. Thus, Clark discloses using an existing database driver for a purpose for which that driver was designed. See, for example, Clark column 1, line 41, to column 2, line 14, for a discussion of the existing JDBC drivers. The Java Beans disclosed in Clark do not intercept or control I/O information or data moving between the JDBC driver and the database. Moreover, Clark does not disclose intercepting and redirecting data passing between the database driver and the database and, in particular, redirecting that data to another data services layer that replicates the data.

Independent claims 1, 9, 17 and 23 have been amended to more particularly point out this difference. In particular, the limitations of claim 5 have been incorporated into claim 1 and the limitations of claim 13 have been incorporated into claim 9. Accordingly, claims 5 and 13 have been canceled. Similar limitations have been introduced into claims 17 and 23. For example, amended claim 1 recites, in lines 6-12, the step of "running, in the host, management facade software that intercepts data flowing between the driver software and the storage device and redirects that data to a kernel module, which is resident on the host computer system and provides the data service by replicating data on the storage device and at least one other storage volume..." Neither the Thomas article nor the Clark patent teaches or suggests directly controlling the data flow between a driver and its associated storage device and redirecting that data to another kernel module in order to provide a data service by replicating that data. Therefore, the combination of these references cannot teach or suggest this.

The examiner cites U.S. Patent No. 5,781,910 (Gostanian) as teaching the use of another data services layer that provides a specific driver to translate connectivity calls to commands that are understandable by the storage device pointing to layer 642 in

Gostanian Figure 6. However, layer 642 is an ODBC driver layer equivalent to the JDBC layer disclosed in Clark. The combination of Thomas, Clark and Gostanian might suggest implementing a data replication system using the Java Beans disclosed in Thomas and Clark to implements the separate data storage systems shown in Gostanian. However, Gostanian teaches a data replication service that is implemented at a much higher level than in the present invention, in particular, by the manager processes 336 and 338. These processes are visible to the applications and thus, the system would not be transparent to the applications even if the Java Beans disclosed in Thomas and Clark were used to implement the manager processes 336 and 338. This is in contrast to the present invention, which would be implemented between layers 642 and 616 in Gostanian and would not be visible to the applications. Consequently, claims 1, 9, 17 and 23 patentably distinguish over the cited combination of references.

Claims 3 and 6-9 are dependent on, and incorporate the limitations of independent claim 1. Therefore, they patentable distinguish over the cited combination of references in the same manner as claim 1. In addition, these claims recite additional limitation not taught or suggested by the cited combination of references. For example, claim 7 recites using a lookup service to obtain a proxy to a bean in a first host and then using that proxy to retrieve another proxy of a bean in another host. Claim 8 recites that the first bean is used to control the second bean from the first host. This operation is used in the set up of a network data replication system. The examiner suggests that this operation is taught in Thomas by the EJB Object that is created for each Enterprise Bean in a Java Beans container. However, as disclosed in Thomas, the EJB Object simply provides an interface that allows a client to call methods in the bean with which it is associated. This interface allows the container to provide lifecycle services for the beans that it contains. The EJB Object might be thought of as a proxy for its associated bean. However, Thomas does not teach or suggest that the EJB Object could be used to retrieve another EJB Object as recited in claim 7 or that the EJB Object for one bean could control another bean via its EJB object as recited in claim 8. Consequently, claims 7 and 8 patentably distinguish over the combination of Thomas and Clark.

Claims 11 and 14-16 are dependent on, and incorporate the limitations of independent claim 9. Therefore, they patentable distinguish over the cited combination

of references in the same manner as claim 9. In addition, these claims recite additional limitations not taught or suggested by the cited combination of references. For example, claims 15-16 contain limitations that parallel those in claims 7-8, respectively. Consequently, they distinguish over the cited combination in the same manner as claims 7-8.

Claims 21-22 and 25-26 are dependent on, and incorporate the limitations of independent claim 17. Therefore, they patentable distinguish over the cited combination of references in the same manner as claim 17. In addition, these claims recite additional limitations not taught or suggested by the cited combination of references. For example, claims 21-22 and 25-26 contain limitations that parallel those in claims 7-8, respectively. Consequently, they distinguish over the cited combination in the same manner as claims 7-8.

Claims 2, 10 and 18 have been rejected under 35 U.S.C. §103(a) as obvious over Thomas in view of Clark and further in view of U.S. Patent No. 6,629,128 (Glass, previously cited.) The examiner comments that the combination of Thomas and Clark teaches the recited limitations except that the combination does not teach using a command line interface to control the system. However the examiner asserts that the Glass patent shows such an interface and it would have been obvious to combine Glass with Thomas and Clark because the combination would permit the java beans to be controlled with a command line.

Although the Glass patent does mention command line interfaces, the reference is not concerned with providing data storage services via a Java Beans architecture. Consequently, its combination with Thomas and Clark cannot remedy the differences between the Thomas and Clark combination and the present invention. Claims 2, 10 and 18 are dependent on, and incorporate the limitations of independent claims 1, 9 and 17, respectively. Therefore, these claims patentable distinguish over the cited combination of references in the same manner as claims 1, 9 and 17.

Claims 4 and 12 have been rejected under 35 U.S.C. §103(a) as obvious over Thomas in view of Clark and further in view of U.S. Patent No. 5,794,013 (McBrearty, previously cited). The examiner comments that the combination of Thomas and Clark teaches the recited limitations except that the combination does not teach inserting a

SCSI terminal emulation interface layer between the driver software and the storage device in order to make the storage device appear as a SCSI device. However the examiner asserts that the McBrearty patent discloses a SCSI emulator inserted between driver software and a remote storage. The examiner concludes it would have been obvious to combine McBrearty with Thomas and Clark because the combination would permit a storage device to operate in a SCSI environment.

As previously mentioned, McBrearty discloses an SCSI to SCSI emulator. Claims 4 and 12 recite a non-SCSI to SCSI emulation layer. Such an emulation layer is not shown in Thomas, Clark or McBrearty or suggested by the combination of these references. Consequently, claims 4 and 12 patentably distinguish over the combination of these references.

In light of the forgoing amendments and remarks, this application is now believed in condition for allowance and a notice of allowance is earnestly solicited. If the examiner has any further questions regarding this amendment, he is invited to call applicants' attorney at the number listed below. The examiner is hereby authorized to charge any fees or direct any payment under 37 C.F.R. §§1.17, 1.16 to Deposit Account number 02-3038.

Respectfully submitted

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